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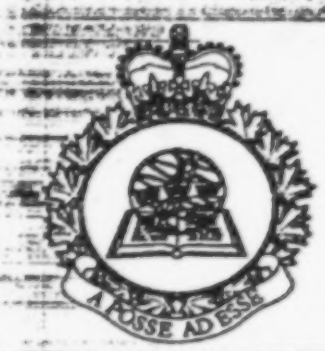

AIR COMMAND HEADQUARTERS

OPERATIONAL RESEARCH DIVISION

STAFF NOTE 94/5

POTENTIAL 600 SERIES OCCUPATION AMALGAMATIONS

by

P.E. DESMIER AND J.M.H. ADAMSSON

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Staff Notes are written as informal records of the results of analyses, tentative views, comments on topics, methodology, which for one reason or another do not warrant or require formal publication. The contents are the responsibility of the author, and do not necessarily reflect the opinion of Air Command.

WINNIPEG, MANITOBA DECEMBER 1994

ABSTRACT

This study provides a rigorous analytical foundation for restructuring the 600 series occupations. The results show that specific occupations can and should be combined without affecting efficiency or flexibility. The procedures first identify candidates for amalgamation, then proceed with further analysis of the top candidates.

RÉSUMÉ

Cette étude fournit une base analytique rigoureuse pour la restructuration des métiers de la série 600. Les résultats démontrent que certains métiers peuvent et devraient être combinés sans diminuer l'efficacité ni la flexibilité. Les procédures déterminent d'abord les candidats d'une telle amalgamation. Elle fait par la suite une analyse des meilleurs candidats.

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POTENTIAL 600 SERIES OCCUPATION AMALGAMATIONS
I - COMMONALITY ANALYSIS

1 – INTRODUCTION

Background

1. In October 1992, an Operational Research (OR) study was commissioned to determine whether optimum manning levels for the Construction Engineering (CE) Military Occupation Structure (MOS) were consistent with the existing establishment [1,2]. The principal aim was to identify the difference between the number of Airfield Engineering personnel available to support CE taskings and the number that is required. The study affirmed what was already known at the time, namely that existing personnel assets could not support all deployments, taskings and training commitments at any one particular time and still provide support to Air Command Wings. Based on this result, recommendations were made for the restructuring of rank levels at most Wings; relocating military Airfield Engineer positions from small Wings and concentrating them at larger centres with identified operational roles and increasing the number of Airfield Engineer reservists to make up the deficiencies noted in the study.

2. In addressing these recommendations (and later the reaction of Budget '94), a second OR study was commissioned whose broad aim was to determine what CE support to operations the Commander requires to meet his mission in peace and deployed operations [3]. Two of the seven objectives of the study focused on addressing the issue of duplication of tasks between some 600 series Military Occupation Codes (MOCs). They are:

a. Determine what tasks must be provided by Airfield Engineers on deployment in support of Air Command Defence Plans (ACDPs); and

b. Determine what occupations can and should be combined without affecting efficiency and flexibility;

3. Question a. was answered by occupation representatives from Air Command headquarters and selected Wings meeting over a period of one week. There job was to break down the tasks based on (a) deployed operations and (b) Main Operating Base (MOB) operations and assign primary and secondary occupations to each task. In order to determine the percentage commonality between each MOC, the results from question a. were analyzed through rigorous database techniques to determine what 600 series occupations could be combined.

2 – METHODOLOGY

Tasking Standards

4. The first step in this procedure was the development of the tasking standards for all occupations. There are two sets of tasking standards, one for wartime deployed operations and another for MOB operations. These documents outline all the tasks that must be performed while on a deployed operation, or at an MOB in Canada.

5. Each task was then broken down into any occupations that are responsible for supervising the task (primary occupation) and any occupations that perform the task (secondary occupation). If an occupation is responsible for supervising the task, it is marked with a 'P'. Any occupation that is capable of performing the task but is not responsible for supervision is marked with an 'X'. These task lists provide the basis for the commonality measurements between occupations.

6. Figure 1 shows an example of the deployed tasking standard for the two occupations MOC 613 and MOC 623. For example, tasks 2d24 and 2d25 are performed by both occupations. Task 2d26 is performed by both occupations, and is also supervised by MOC 623. Both occupations are responsible for the supervision of task 2d27, etc.

Task	MOC 613	MOC 623
2d24	X	X
2d25	X	X
2d26	X	P
2d27	P	P
2d28	X	
2d29	P	P

Figure 1. Sample Deployed Tasking Standard

Commonality Measures

7. The commonality of one occupation with another is measured as a percentage, and represents the portion of the duties of one occupation that is included in the other occupation. In other words, the percentage commonality of MOC X with MOC Y describes the percentage of duties of MOC X that are also duties of MOC Y.

8. As an example, consider the partial table in Figure 1. In this example, task 2d24 is marked by an 'X' for both MOC 613 and MOC 623. Therefore, this is a duty of MOC 613 that is also a duty of MOC 623. Alternatively, it is a duty of MOC 623 that is also a duty of MOC 613. This situation is denoted by a double headed arrow, as shown in Figure 2.

9. Task 2d26 is marked as an 'X' for MOC 613, and as a 'P' for MOC 623. Since this indicates that the task is performed by MOC 613 and MOC 623, it is a duty of MOC 613 that is also performed by MOC 623. However, it is a task that is supervised by MOC 623, but not by MOC 613. Therefore, it is an example of a task for MOC 623 that is not performed by MOC 613. This is given by a single headed arrow, pointing from MOC 613 to MOC 623, as shown in Figure 2.

10. Task 2d27 is marked by a 'P' for both occupations, therefore, it is a task performed and supervised by each that is also performed and supervised by the other. Once again, this is given as a double headed arrow in Figure 2.

11. There are a total of six tasks for MOC 613 in this example, five of which are common tasks with MOC 623. Therefore, the percentage commonality of MOC 613 with MOC 623 is five divided by six, or 83.3%. For MOC 623, there are five tasks in total, four of which are common tasks with MOC 613. The commonality MOC 623 with MOC 613 is four divided by five, or 80.0%.

Task	MOC 613		MOC 623
2d24	X	⟷	X
2d25	X	⟷	X
2d26	X	→	P
2d27	P	⟷	P
2d28	X		
2d29	P	⟷	P

Figure 2. Tasking Commonalities

12. The commonality of one occupation with another in terms of supervisory, or 'P' tasks, is calculated in the same manner as above, but only considering supervisory tasks. Figure 3 demonstrates the relation between the supervisory tasks in the example. There are two supervisory tasks under MOC 613, both of which are also supervisory tasks for MOC 623. The percentage commonality of MOC 613 with MOC 623 in terms of supervisory tasks is therefore 100%. MOC 623 has three tasks, two of which are in common with MOC 613, giving a commonality of MOC 623 with MOC 613 of 66.6%. The results of this example are summarized below in Table 1.

Task	MOC 613		MOC 623
2d24	X		X
2d25	X		X
2d26	X		P
2d27	P	◄——►	P
2d28	X		
2d29	P	◄——►	P

Figure 3. Supervisory Commonalities

	Regular Tasks (X & P)			Supervisory Tasks (P Only)		
Commonality	Number of Tasks in Common	Total Number of Tasks	Percentage Commonality	Number of Tasks in Common	Total Number of Tasks	Percentage Commonality
613 with 623	5	6	83.3	2	2	100
623 with 613	4	5	80	2	3	66.6

Table 1. Commonality Table for Deployed Example

13. The example above used deployed tasks. The calculations for MOB tasks are made in the same way. For example, Figure 4 gives a sample from the MOB tasking standard. The entries in this sample give the commonalities summarized in Table 2. Tables A-1 and A-2 of Annex A provide the complete percentage of commonality between the twelve 600 series occupations for Regular Tasks and Supervisory Tasks respectively.

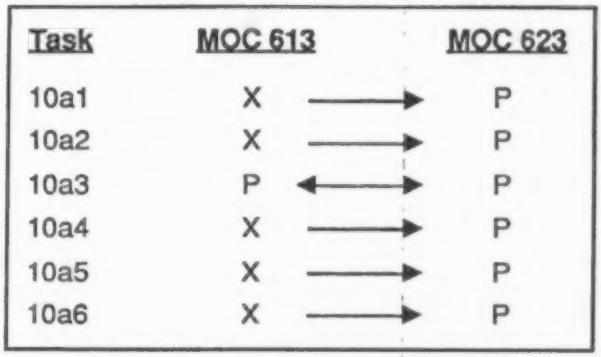

Figure 4. Sample MOB Tasking Standard

	Regular Tasks (X & P)			Supervisory Tasks (P Only)		
Commonality	Number of Tasks in Common	Total Number of Tasks	Percentage Commonality	Number of Tasks in Common	Total Number of Tasks	Percentage Commonality
613 with 623	6	6	100	1	1	100
623 with 613	1	6	16.7	1	6	16.7

Table 2. Commonality Table for MOB Example

3 – RESULTS

Percentage Commonality

14. Table 3 presents the preliminary results based on Tables A-1 and A-2 of Annex A. The one-to-one correspondence for each commonality (MOC X ➞ MOC Y) does not mean that MOC X should be absorbed by MOC Y. It simply gives an indication of the degree of training that would be required in combining the two MOCs, i.e., MOC X would require more training than MOC Y. Except for 614 ➞ 622, it is encouraging to note that the highest commonalities are consistent for both regular taskings and supervisory taskings.

Regular Taskings (X&P)	Supervisory Taskings (P Only)
611 ➞ 615	611 ➞ 615
614 ➞ 622	
623 ➞ 613	623 ➞ 613
625 ➞ 615	625 ➞ 615
OPTIONAL	
622 ➞ 614	613 ➞ 623
624 ➞ 613	615 ➞ 625
631 ➞ 615	

Table 3. Preliminary Results for Percentage of Commonality between 600 Series Occupations

Weighted Mean Calculation

15. Given the values in Tables A-1 and A-2, a simple formula is used to give an overall measure of the commonality of one occupation with another. A weighted mean is used, with the supervisory commonalities having a weight of 0.6, and the other commonalities having a weight of 0.4[1]. In mathematical terms, define:

X_1 = Percentage commonality of regular tasks (Deployed Operations)
X_2 = Percentage commonality of regular tasks (MOB Operations)
X_3 = Percentage commonality of supervisory tasks (Deployed Operations)
X_4 = Percentage commonality of supervisory tasks (MOB Operations)

16. Once these variables are defined, the weighted mean is calculated as:

[1]Supervisory skills are given a higher weight since they require more training and should, therefore, form the main focus of combining MOCs.

$$X = \frac{w_1X_1 + w_2X_2 + w_3X_3 + w_4X_4}{w_1 + w_2 + w_3 + w_4} \quad , \tag{1}$$

where

$$w_1 = w_2 = 0.4$$
$$w_3 = w_4 = 0.6 \quad . \tag{2}$$

17. In the hypothetical example of Tables 1 and 2, the weighted mean commonality of MOC 613 with MOC 623 is given by:

$$X = \frac{(0.4 \times 0.833) + (0.4 \times 1) + (0.6 \times 0.8) + (0.6 \times 1)}{2}$$
$$= 0.907 \tag{3}$$

The weighted mean commonality of MOC 623 with MOC 613 is given by:

$$X = \frac{(0.4 \times 1) + (0.4 \times 0.167) + (0.6 \times 0.666) + (0.6 \times 0.167)}{2}$$
$$= 0.483 \tag{4}$$

Therefore, MOC 613 has a 90.7% commonality with MOC 623, and MOC 623 has a 48.3% commonality with MOC 613.

18. The results of applying equations (1) and (2) to Tables A-1 and A-2 are summarized in Table B-1 (Annex B). As was done in Tables A-1 and A-2, those MOCs with the highest commonalities, and recommended for amalgamation, are denoted by a shaded cell. These MOCs are shown in Table 4.

611 ➞ 615	
613 ➞ 623	623 ➞ 613
614 ➞ 622	
615 ➞ 625	625 ➞ 615
624 ➞ 613	

Table 4. MOCs with Highest Commonalities

4 – DISCUSSION

19. An interesting feature of Table 4 is that the highest commonalities in the preliminary results (Table 3) remain the highest in the final results. As well, the one-to-one correspondence between 613 ➞ 623 and 615 ➞ 625 is equally strong in either direction. Clearly, these groups would be strong contenders for amalgamation since it is anticipated that the expected training requirement would not be too high for either MOC.

20. On June 1 1994, a CE Military Occupational Structure (CE MOS) Study workshop met in Ottawa to, among other things, discuss the potential amalgamation of the CE MOCs. Seven syndicates were formed with representatives of specific occupations to discuss the possibility of combining their occupations. Six syndicates considered the amalgamation of various MOCs (Table 5), whereas the seventh looked at restructuring the MOC 631 occupation. In all cases, the workshop suggested that more detailed studies were required before any firm decisions could be reached regarding any possible amalgamation. The results of the workshop are summarized in Table 5.

Serial	Syndicate	MOCs	Amalgamation
1	A	614–622	Possible
2	B	613–623	Possible
3	B	613–624	Possible
4	C	613–621–623	Unknown
5	D	611–612–615	Yes
6	E	615–625	Possible

Table 5. Workshop Results for the Amalgamation of CE MOCs

21. It is encouraging to note that the results of serials 1, 2, 3 and 6 have already been proven mathematically with high commonalities of 61.7%, 67.3%, 59.7% and 75.6% respectively. Those MOC combinations in Table 5 not covered by the recommendations of Table 4 are listed in Table 6. The

lower percentage commonalities would be expected to result in a larger training bill.

Serial	MOCs	Commonality (%)
4	613–621	43.3
	623–621	51.7
5	611–612	50.5
	612–615	48.4

Table 6. Percentage Commonality for Workshop Results not Covered by Recommendations

II – FURTHER ANALYSIS

1 – METHODOLOGY

22. The top candidates for occupation combinations can now be identified and studied further. The process of studying a combination involves a detailed analysis of the actual list of tasks to determine where upgrading is required for one of the occupations.

23. A task needs to be upgraded by occupation 'A' when combined with occupation 'B' if one of three conditions hold:

a. the entry for MOC 'A' is blank and the entry for MOC 'B' is an 'X';
b. the entry for MOC 'A' is blank and the entry for MOC 'B' is a 'P'; or
c. the entry for MOC 'A' is an 'X' and the entry for MOC 'B' is a 'P'.

24. Each task in the list will fall into one of three categories:

a. the requirement for each MOC is the same;
b. MOC 'A' requires upgrading; or
c. MOC 'B' requires upgrading.

25. For example, considering the partial tasking standard in Figure 1, there are four tasks that have equal skill levels (tasks 2d24, 2d25, 2d27, and

2d29), one that requires an upgrade for MOC 613 (task 2d26) and one that requires an upgrade for MOC 623 (task 2d28). These results can be displayed as the first pie chart in Figure 5.

26. There are a number of tasks in the tasking standard which are considered to be common tasks. These are tasks that are performed by at least eight of the MOC 600 series occupations. When these tasks are eliminated from consideration, the tasks that remain are those tasks that are specialized and, in most cases, require extra training. This requirement is therefore a better indication of the required specialization of the occupations. As an example, assume that two of the four tasks in Figure 1 that have the same requirement are common tasks. The result is given as the second pie chart in Figure 5.

27. Once the tasks that form the differential between the two occupations have been determined, a measure of degree of difference has to be resolved. This can most easily be measured by the amount of training required to upgrade from one occupation to the other. The total amount of training required depends, in turn, on the qualification level (QL) and number of people at each level. The total training required (*TTR*) can be summarized in a table such as Table 7.

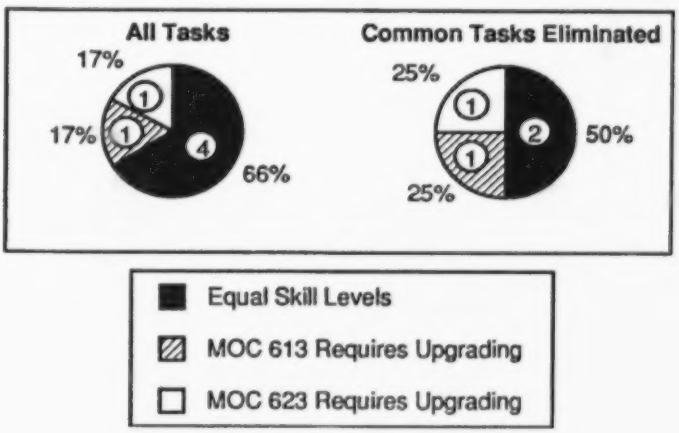

Figure 5. MOC 613 and MOC 623 Commonality

		Proficiency Level			
		QL 3	QL 5	QL 6	*TTR*
Number of MOC 613 Pers		0	31	15	
Upgrade to MOC 623	Hours Req'd	300	411	116	
	TTR (Hours)	0	12741	1740	**14481**
Number of MOC 623 Pers		8	19	20	
Upgrade to MOC 613	Hours Req'd	413	535	210	
	TTR (Hours)	3304	10165	4200	**17669**

Table 7. Total Training Required For MOC 613/623 Merge

2 – RESULTS

28. Five study groups made up of specific CE occupations within Air Command Headquarters were formed to look at occupation combinations such as those given in Tables 4 and 5. Specific combinations are listed in Table 8. Also listed in this table are the commonality percentages (as taken from Table B-1 in Annex B). The results of commonality analyses of these combinations are detailed in Annex C (Serials 1,2 & 3), Annex D (Serial 4), Annex E (Serial 5) and Annex F (Serial 6). In addition to the studies listed below, there was one additional group which looked at the commonality of MOC 631 with other, non-600 series MOCs; specifically MOCs 831, 841 and 911. The results of this analysis are given in Annex G (Serial 7).

Serial	Occupations	% Commonality
1	613 → 623 / 623 → 613	63.5 / 67.3
2	613 → 624 / 624 → 613	51.5 / 59.7
3	623 → 624 / 624 → 623	40.2 / 44.9
4	611 → 612 / 612 → 611	50.5 / 41.5
5	614 → 622 / 622→ 614	61.7 / 55.3
6	615 → 625 / 625 → 615	67.7 / 75.6
7	631 → 831 / 841 / 911	N/A

Table 8. MOC 600 Occupation Combination Studies

3 – DISCUSSION

613/623/624 Commonality

29. The three possible combinations of MOC 613, MOC 623 and MOC 624 are examined in Annex C. Using the MOC 613/623 amalgamation as a baseline[1], the combination of MOCs 613/624 and MOCs 623/624 requires 53% and 33% more training respectively. The combination of MOCs 623/624 was not considered within part I of this study due to a low 40.2% commonality.

30. Figures C-1 to C-3 provide another indication of the optimum combination of MOCs. Focusing on the pie charts labelled "Common Tasks Eliminated" (since this represents the core of the particular MOCs), Figure C-1 (MOCs 613/623) shows that 48% of 96 tasks are at equal skill levels compared to 21% of 109 tasks for MOCs 613/624 (Figure C-2) and 20% of 101 tasks for MOCs 623/624 (Figure C-3). Clearly, the order of priority for amalgamation should be MOCs 613/623 > MOCs 613/624 > MOCs 623/624 as proven in Part I of this report.

611/612/615 Commonality

31. The study group for MOCs 611/612/615 amalgamation only considered the 611/612 combination (Annex D). Even though this study showed that MOCs 611/615 had one of the highest percentage of commonality, it was nevertheless concluded that since MOC 611 and MOC 612 were "feeder" occupations whereas MOC 615 was a "cap" occupation, the study group would only consider the 611/612 amalgamation.

32. As Table B-1 shows, the 611/612 combination showed only a 50.5% commonality. However, as Figure D-1 shows, 39% of 96 non-common tasks were at an equal skills level.

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[1]The total training required to amalgamate MOC 613 and MOC 623 is 24155 hrs (Annex C; Table C-1).

614/622 Commonality

33. The amalgamation of MOC 614 and MOC 622 was recommended by both this study and the CE MOS workshop due to its high commonality of tasks (61.7%). As Annex E shows (Table E-1), the total training required is 39510 hours of which 15165 hours is for MOC 614 to upgrade to MOC 622 and 24345 hours is for MOC 622 to upgrade to MOC 614. However, as Figure E-1 shows, with common tasks eliminated, only 45% of 75 tasks are at an equal skill level with 48% requiring upgrade for MOC 614.

615/625 Commonality

34. The amalgamation of MOC 615 and MOC 625 was also recommended by this study and the CE MOS workshop. The commonality of tasks was second highest overall (67.7%). As Annex F shows (Table F-1), the total training required is 101443.5 hours of which 65923.5 hours is for MOC 615 to upgrade to MOC 625 and 35520 hours is for MOC 625 to upgrade to MOC 615. As Figure F-1 shows, with common tasks eliminated, 30% of 100 tasks are at an equal skill level with 54% requiring upgrade for MOC 625.

631/831/841/911 and Civilian Classification Commonality

35. This analysis was based on the devolution of MOC 631 tasks into either MOC 831, MOC 841, MOC 911 or civilian occupations. As Table G-1 shows, the three optional occupations for devolution of MOC 631 would require 71%, 62% and 56% upgrading respectively in their training to accomplish the functions expected of MOC 631. With common tasks eliminated, the civilian occupations have the highest degree of commonality with 60% of 122 tasks at an equal skills level. The lowest candidate is MOC 831 with 29% of 122 tasks at an equal skills level.

36. If MOC 631 can provide services of each of MOCs 831, 841 and 911 at a semi-skilled level, then it might be advantageous to consider forming an occupation somewhat like MOC 631 but formed primarily out of MOC 831 (Adm Clk) and MOC 841 (Fin Clk).

4 – CONCLUSIONS

37. This study provides a rigorous analytical foundation for restructuring the 600 series occupations. The results show that specific occupations can and should be combined in the interest of enhanced flexibility and increased efficiency.

38. The methodology first determines the best candidates for amalgamation (as outlined in Part I), then provide a further analysis of the selected options (Part II). The reliability of the method is shown by the high correlation of the recommendations for amalgamation with those derived by an independent workshop in Ottawa.

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[8] Discussion Capt B.A. Raindahl/Mr. J. Adamsson, 19 Sep 94.

[9] Discussion CWO L.W. Carlson/Mr. J. Adamsson, 27 Jul 94.

Annex A
Op Rsch Staff Note 94/5
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PERCENTAGE OF COMMONALITY BETWEEN MOCS

1. Tables A-1 and A-2 show the percentage of commonality between the CE 600 series occupations. For regular taskings (Table A-1), there exists a stronger commonality between deployed taskings as opposed to MOB taskings, whereas the differentiation is not as clear for supervisory taskings (Table A-2).

2. Shaded cells in Tables A-1 and A-2 indicate the highest commonalities between MOCs, i.e., strong contenders for combining. The criteria for selecting cells is as follows:

a. For regular taskings (X&P), deployed taskings should show a greater than 90% commonality with MOB taskings greater than 80% or at least a high 70%.

b. For supervisory taskings (P only), each component of the cell should be greater than 50%.

c. Borderline cases are denoted as bold type but not shaded.

3. It should be noted that although Table A-1 shows a high commonality between MOCs 631 and 615, it is unlikely that MOC 615 will do MOC 631 tasks even though there are common areas with both occupations. MOCs 615/625 are managerial occupations and are required on the work site or in planning.

MOC	611	612	613	614	615	621	622	623	624	625	631	651
611:		87,80	86,74	86,76	93,83	86,72	86,72	86,72	87,70	88,76	85,67	86,63
612:	83,78		83,75	83,75	88,76	84,73	83,71	83,71	84,73	83,73	81,62	82,62
613:	80,56	81,57		81,63	81,58	85,61	82,63	88,75	89,74	81,57	78,47	80,51
614:	87,68	88,68	89,77		88,70	89,78	90,82	88,72	88,67	88,67	85,57	87,62
615:	81,69	78,65	74,67	74,67		74,63	74,65	74,65	76,65	88,87	77,67	78,67
621:	78,57	79,60	83,64	79,64	78,58		83,63	84,69	80,63	80,60	77,49	79,55
622:	88,66	89,66	91,75	92,78	89,68	94,73		91,73	91,69	90,69	86,56	89,59
623:	86,59	86,60	94,79	87,63	86,59	92,69	89,65		88,65	87,59	84,50	86,54
624:	82,66	83,70	89,88	82,71	85,71	83,75	84,73	83,77		84,71	80,57	83,63
625:	83,69	81,67	81,69	81,69	95,88	82,69	81,69	81,67	83,69		85,67	85,69
631:	89,62	89,60	89,60	89,60	95,78	89,60	89,60	89,60	89,60	96,73		91,67
651:	87,41	87,41	87,46	87,44	93,50	88,44	88,41	87,43	89,44	93,50	87,41	

Table A-1. Percentage of Commonality Between MOC X: MOC Y (Read MOC X in MOC Y) for Regular (X&P) Taskings (Read each table entry as: Deployed Taskings, MOB Taskings)

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MOC	611	612	613	614	615	621	622	623	624	625	631	651
611:		14,43	7,14	7,14	***55,71***	7,0	7,14	7,14	11,0	23,43	7,14	7,14
612:	11,20		7,13	5,13	32,20	11,13	5,7	5,7	11,13	5,13	4,0	4,7
613:	7,4	9,8		13,16	11,8	31,16	18,24	***47,56***	31,32	9,8	4,0	7,16
614:	8,9	8,18	16,36		8,18	11,45	27,64	11,27	8,18	8,18	5,0	5,27
615:	39,28	29,17	8,11	5,11		5,6	5,11	5,6	21,11	***42,67***	8,44	18,39
621:	4,0	9,7	20,15	6,19	4,4		17,15	23,22	7,15	12,7	4,0	7,11
622:	10,5	10,5	28,32	34,37	10,11	41,21		28,26	21,16	17,11	7,0	10,5
623:	8,4	8,4	***55,54***	11,12	8,4	42,23	21,19		13,19	11,4	5,0	5,8
624:	10,0	12,13	28,53	6,13	26,13	10,27	12,20	10,33		22,13	4,0	16,20
625:	24,17	7,11	10,11	7,11	***63,67***	20,11	12,11	10,6	27,11		15,33	27,39
631:	17,6	11,0	11,0	11,0	28,44	17,0	11,0	11,0	11,0	33,33		33,28
651:	10,2	6,2	10,10	6,7	35,17	16,7	10,2	6,5	26,7	35,17	19,12	

Table A-2. Percentage of Commonality Between MOC X: MOC Y (Read MOC X in MOC Y) for Supervisory (P Only) Taskings (Read each table entry as: Deployed Taskings, MOB Taskings)

Annex B
Op Rsch Staff Note 94/5
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PERCENTAGE OF COMMONALITY BETWEEN MOCS (WEIGHTED MEAN)

1. Table B-1 shows the percentage of commonality between the CE 600 series occupations using the weighted mean equations (1) and (2). Shaded cells in Table B-1 indicate the highest commonalities between MOCs, i.e., the strongest contenders for combining.

MOC	611	612	613	614	615	621	622	623	624	625	631	651
611:		50.5	38.3	38.7	73	33.7	37.9	37.9	34.7	52.6	36.7	36.1
612:	41.5		37.6	37	48.4	38.6	34.4	34.4	38.6	36.6	29.8	32.1
613:	30.5	32.7		37.5	33.5	43.3	41.6	63.5	51.5	32.7	26.2	33.1
614:	36.1	39	48.8		39.4	50.2	61.7	43.4	38.8	38.8	29.9	39.4
615:	50.1	42.4	33.9	33		30.7	32.6	31.1	37.8	67.7	44.4	46.1
621:	28.2	32.6	39.9	36.1	29.6		38.8	44.1	35.2	33.7	26.4	32.2
622:	35.3	35.5	51.2	55.3	37.7	52		49	43.1	40.2	30.5	34.1
623:	32.6	32.8	67.3	36.9	32.6	51.7	42.8		40.2	33.7	28.3	31.9
624:	32.6	38.1	59.7	36.3	42.9	42.7	41	44.9		41.5	28.6	40
625:	42.7	35	36.3	35.4	75.6	39.5	36.9	34.4	41.8		44.8	50.6
631:	37.1	33.1	33.1	33.1	56.2	34.9	33.1	33.1	33.1	53.6		49.9
651:	29.2	28	32.6	30.1	44.2	33.3	29.4	29.3	36.5	44.2	34.9	

Table B-1. Percentage of Commonality Between MOC X: MOC Y (Read MOC X in MOC Y) (Weighted Mean)

MOCs 613, 623, AND 624 COMMONALITY ANALYSIS

1. An analysis of the possible combinations of MOCs 613, 623, and 624 into a single occupation was performed using the data supplied by the 613/623/624 study group. The results provided:

a. the percentage of tasks requiring an equal skill level for all MOCs, i.e., all having a skill level of "X" or all having a skill level of "P";

b. the percentage of MOC 613 that needs upgrading to meet the requirements of an occupation combination;

c. the percentage of MOC 623 that needs upgrading to meet the requirements of an occupation combination; and

d. the percentage of MOC 624 that needs upgrading to meet the requirements of an occupation combination.

2. The results in Figure C-1 are based on analyses of MOC 613 in relation to MOC 623 for:

a. all tasks performed by at least one of the occupations in question; and

b. all tasks performed by at least one of the occupations in question with all tasks common to at least eight MOCs eliminated.

3. It has been determined that the extra training hours required for upgrading MOC 613 to MOC 623 standards are 300 hrs to QL 3 proficiency, 411 hrs to QL 5 proficiency, and 116 hrs to QL 6A proficiency [4]. Therefore, the total training required (TTR) to upgrade MOC 613 personnel to the combined occupation skills is defined by the equation:

$$TTR = 300a + 411b + 116c \quad , \qquad \text{(C-1)}$$

where, within MOC 613:

a = number of personnel at QL 3 level;
b = number of personnel at QL 5 level; and
c = number of personnel at QL 6A level.

4. Similarly, the extra training hours required for upgrading MOC 623 to MOC 613 standards are 365 hrs to QL 3 proficiency, 231 hrs to QL 5 proficiency, and 56 hrs to QL 6A proficiency. Therefore, the total training required (TTR) to upgrade MOC 623 personnel to the combined occupation skills is defined by the equation:

$$TTR = 365a + 231b + 56c \quad , \qquad \text{(C-2)}$$

where a, b, and c for MOC 623 are as defined above. The TTR and numbers of personnel for MOC 613 and MOC 623 are summarized in Table C-1.

5. Figures C-2 and C-3 give the relation of MOC 613 to MOC 624, and MOC 623 to MOC 624 respectively. The total training required can be calculated in a manner similar to equation (5). The number of personnel and TTR for each pair of occupations is given in Tables C-2 and C-3.

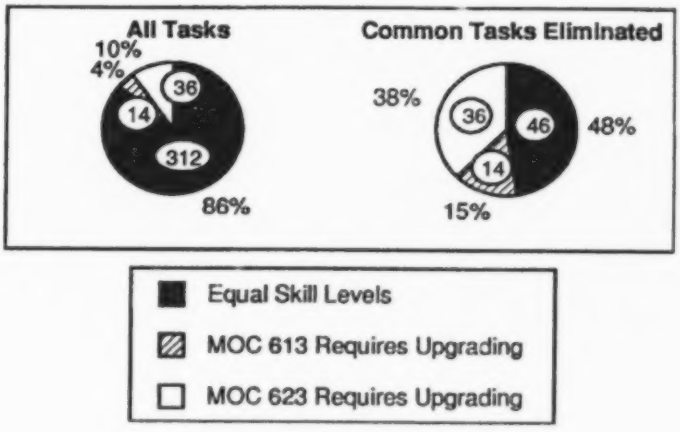

Figure C-1. MOC 613 and MOC 623 Commonality

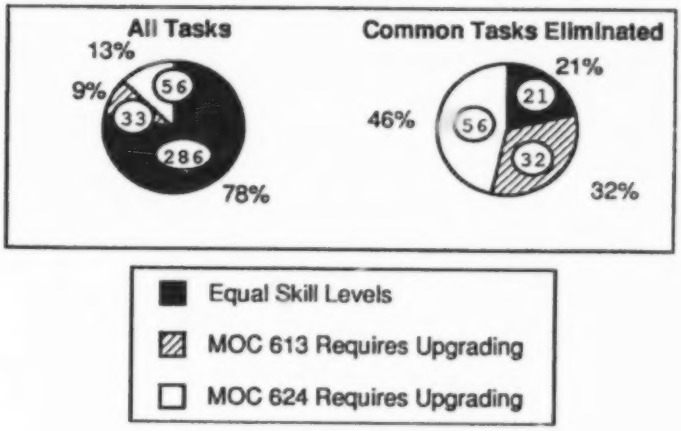

Figure C-2. MOC 613 and MOC 624 Commonality

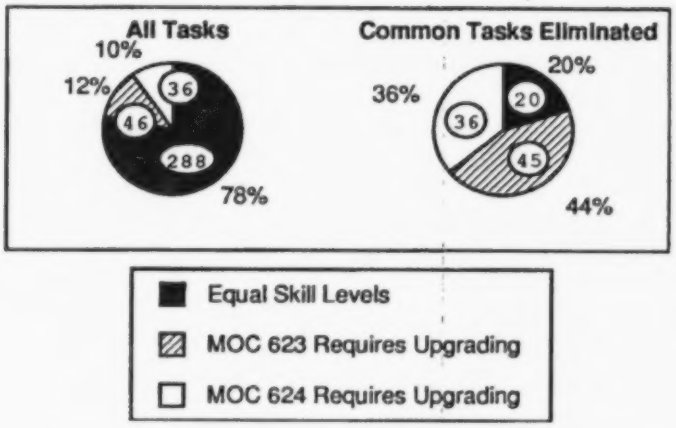

Figure C-3. MOC 623 and MOC 624 Commonality

		Proficiency Level			
		QL 3	QL 5	QL 6A	*TTR*
Number of MOC 613 Pers		0	31	15	
Upgrade to MOC 623	Hours Req'd	300	411	116	
	TTR (Hours)	0	12741	1740	**14481**
Number of MOC 623 Pers		7	25	24	
Upgrade to MOC 613	Hours Req'd	365	231	56	
	TTR (Hours)	2555	5775	1344	**9674**

Table C-1. Total Training Required For MOC 613/623 Merge

		Proficiency Level			
		QL 3	QL 5	QL 6A	*TTR*
Number of MOC 613 Pers		0	31	15	
Upgrade to MOC 624	Hours Req'd	289	566	111	
	TTR (Hours)	0	17546	1665	**19211**
Number of MOC 624 Pers		8	19	20	
Upgrade to MOC 613	Hours Req'd	413	535	210	
	TTR (Hours)	3304	10165	4200	**17669**

Table C-2. Total Training Required For MOC 613/624 Merge

		Proficiency Level			
		QL 3	QL 5	QL 6A	*TTR*
Number of MOC 623 Pers		7	25	24	
Upgrade to MOC 624	Hours Req'd	364	517	70	
	TTR (Hours)	2548	12925	1680	**17153**
Number of MOC 624 Pers		8	19	20	
Upgrade to MOC 623	Hours Req'd	575	356	185	
	TTR (Hours)	4600	6764	3700	**15064**

Table C-3. Total Training Required For MOC 623/624 Merge

Annex D
Op Rsch Staff Note 94/5
December 1994

MOC 611, 612, AND 615 COMMONALITY ANALYSIS

1. The MOC 611/612/615 study group studied only one trade combination[1], i.e., MOC 611 and 612 [5]. All data supplied by the 611/612/615 study group was analyzed to provide:

   a. the percent of both MOCs that are at an equal skill level, i.e., "X" = "X" and "P" = "P";

   b. the percent of MOC 611 that needs upgrading to MOC 612; and

   c. the percent of MOC 612 that needs upgrading to MOC 611.

2. The results in Figure D-1 are based on analyses of MOCs 611/612 for:

   a. all tasks performed by either MOC 611 or MOC 612; and

   b. all tasks performed by either MOC 611 or MOC 612 with all tasks common to at least eight MOCs eliminated.

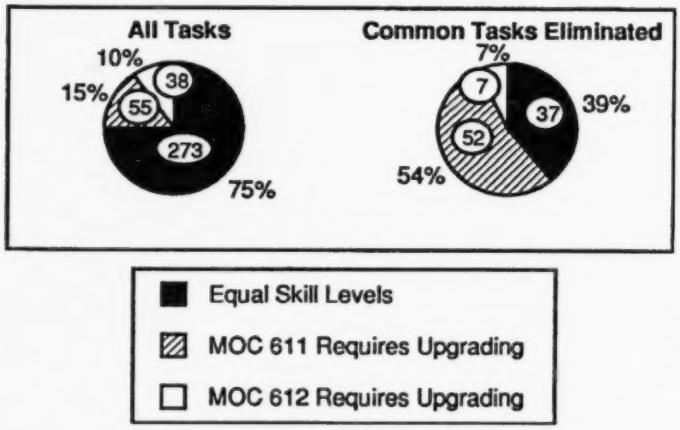

Figure D-1. MOC 611 and MOC 612 Commonality

[1]Rather than a strict combination of occupations based on MOC 615, the study group looked at a redistribution of tasks between other occupations.

MOC 614 AND MOC 622 COMMONALITY ANALYSIS

1. All data supplied by the 614/622 study group was analyzed to provide:

   a. the percent of both MOCs that are at an equal skill level, i.e., "X" = "X" and "P" = "P";

   b. the percent of MOC 614 that needs upgrading to MOC 622; and

   c. the percent of MOC 622 that needs upgrading to MOC 614.

2. The results in Figure E-1 are based on analyses of MOCs 614/622 for:

   a. all tasks performed by either MOC 614 or MOC 622; and

   b. all tasks performed by either MOC 614 or MOC 622 with all tasks common to at least eight MOCs eliminated.

3. It has been determined that the extra training hours required for upgrading MOC 614 to MOC 622 are 337 hrs to QL 3 proficiency, 379 hrs to QL 5 proficiency, and 52 hrs to QL 6A proficiency [6]. Therefore, the total training required (*TTR*) to upgrade MOC 614 personnel to MOC 622 skills is defined by the equation:

$$TTR = 337a + 379\,b + 52\,c \quad , \qquad \text{(E-1)}$$

where, within MOC 614:

a = number of personnel at QL 3 level;
b = number of personnel at QL 5 level; and
c = number of personnel at QL 6A level.

4. In the same manner, the extra training hours required for upgrading MOC 622 to MOC 614 have been determined as 400 hrs to QL 3 proficiency, 377 hrs to QL 5 proficiency, and 60 hrs to QL 6A proficiency [7]. Therefore, the total training required to upgrade MOC 622 personnel to MOC 614 skills is defined by the equation:

$$TTR = 400\,a + 377\,b + 60\,c \quad , \qquad \text{(E-2)}$$

where a, b, and c (for MOC 622) were as defined previously.

5. The number of personnel currently at each proficiency level are given in Table E-1. The TTR for each occupation is also given in Table E-1.

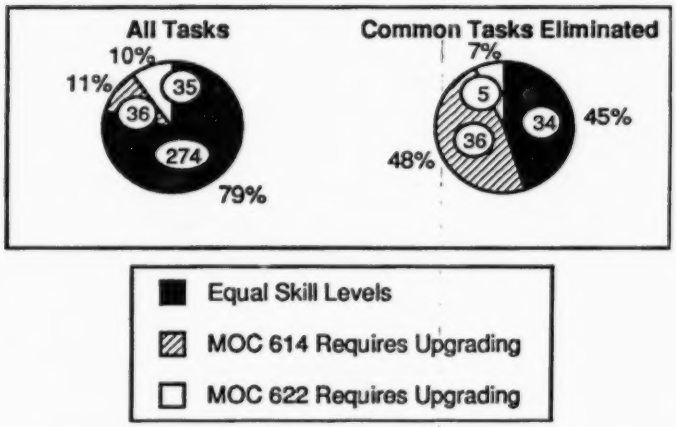

Figure E-1. MOC 614 and MOC 622 Commonality

		Proficiency Level			
		QL 3	QL 5	QL 6A	*TTR*
Number of MOC 614 Pers		5	32	26	
Upgrade to MOC 622	Hours Req'd	337	379	52	
	TTR (Hours)	1685	12128	1352	**15165**
Number of MOC 622 Pers		9	45	63	
Upgrade to MOC 614	Hours Req'd	400	377	60	
	TTR (Hours)	3600	16965	3780	**24345**

Table E-1. Total Training Required For MOC 614/622 Merge

MOC 615 AND MOC 625 COMMONALITY ANALYSIS

1. All data supplied by the 615/625 study group was analyzed to provide:

   a. the percent of both MOCs that are at an equal skill level, i.e., "X" = "X" and "P" = "P";

   b. the percent of MOC 615 that needs upgrading to MOC 625; and

   c. the percent of MOC 625 that needs upgrading to MOC 615.

2. The results in Figure F-1 are based on analyses of MOCs 615/625 for:

   a. all tasks performed by either MOC 615 or MOC 625; and

   b. all tasks performed by either MOC 615 or MOC 625 with all tasks common to at least eight MOCs eliminated.

3. It has been determined that the extra training hours required for upgrading MOC 615 to MOC 625 consists of 309.5 hrs [8]. The training time required to upgrade MOC 625 to MOC 615 is 444 hrs. These times are based on the current training requirements for MOCs 615 and 625.

4. The number of personnel currently at each proficiency level are given in Table F-1 [8]. The Total Training Requirements (TTR) for each occupation is also given in Table F-1.

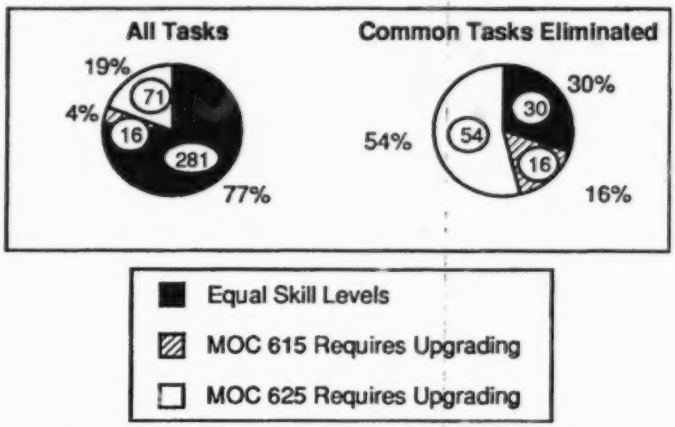

Figure F-1. MOC 615 and MOC 625 Commonality

Number of MOC 615 Pers		213
Upgrade to MOC 625	Hours Req'd	309.5
	TTR (Hours)	65923.5
Number of MOC 625 Pers		80
Upgrade to MOC 615	Hours Req'd	444
	TTR (Hours)	35520

Table F-1. Total Training Required For MOC 615/625 Merge

MOC 631, 831, 841, 911 AND CIVILIAN CLASSIFICATION COMMONALITY ANALYSIS

1. This analysis is based on the devolution of MOC 631 tasks into either MOC 831, MOC 841, MOC 911 or civilian occupations. All data supplied by the 631 study group was analyzed to provide [9]:

a. the number of MOC 631 tasks that each of MOCs 831, 841, 911, and civilian classifications require upgrading to perform;

b. the number of MOC 631 tasks that a combination of MOC 831, 841, and 911 require upgrading to perform; and

c. the number of MOC 631 tasks that a combination of MOCs 831, 841, and 911 and civilian classifications require upgrading to perform.

2. The results in Figure G-1 are based on analyses of MOCs 631/831 for comparison of:

a. all tasks performed by MOC 631 of which MOC 831 is trained including those tasks which could be expected of either trade due to general service requirements; and

b. all the MOC 631 trade related tasks of which 831 is trained, excluding any tasks common to at least eight 600 series MOCs and each of MOCs 831, 841, and 911.

3. Figure G-2 provides similar information on a comparison of MOC 631 with MOC 841. Figures G-3 and G-4 give a comparison of MOC 631 with MOC 911 and Civilian occupations respectively. Figure G-5 compares MOC 631 with all reviewed military occupations combined, and Figure G-6 compares MOC631 with all reviewed military MOCs and applicable civilian classifications.

4. The commonality between the assessed trades, based on the data provided, is given in Table G-1.

		% 631 Tasks Common To:			
		831	841	911	Civ
Encompassing All Tasks	No Upgrade Required	76	79	81	20
	Upgrade Required	24	21	19	80
General Service Tasks Eliminated	No Upgrade Required	29	38	44	60
	Upgrade Required	71	62	56	40

Table G-1. MOC 631 Task Comparisons

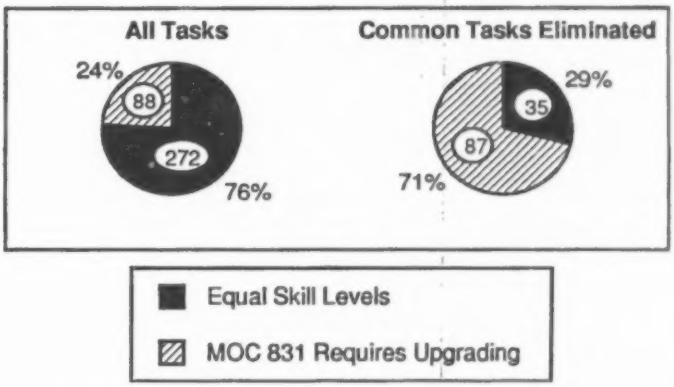

Figure G-1. MOC 631 and MOC 831 Commonality

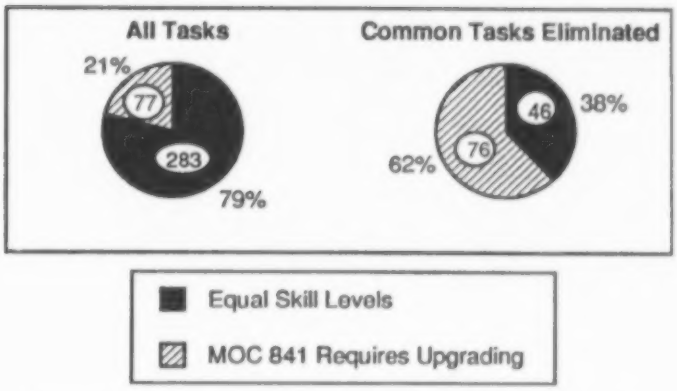

Figure G-2. MOC 631 and MOC 841 Commonality

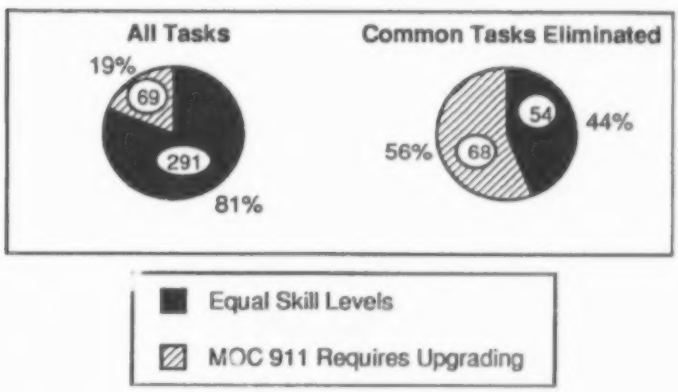

Figure G-3. MOC 631 and MOC 911 Commonality

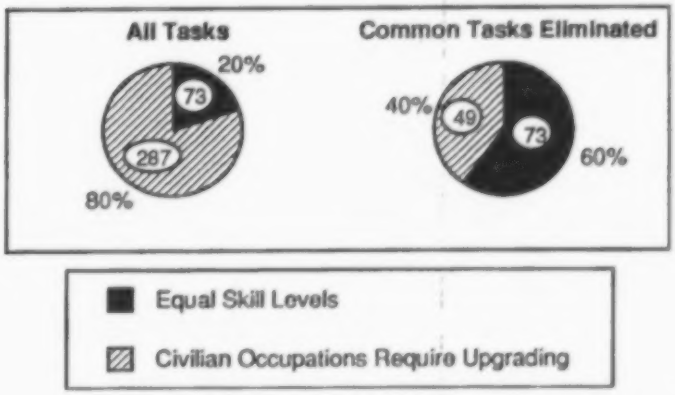

Figure G-4. MOC 631 and Civilian Occupations Commonality

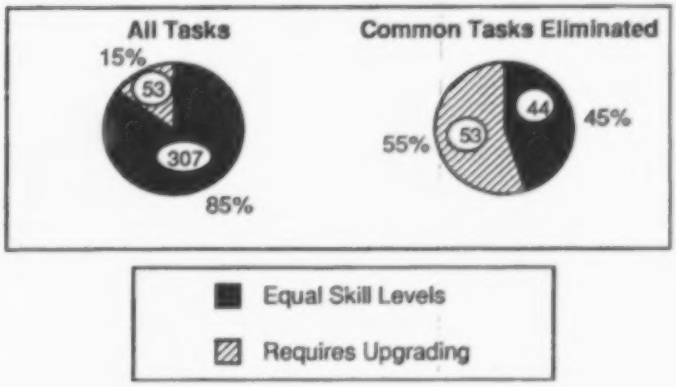

Figure G-5. MOC 631 and Military Occupation Commonality

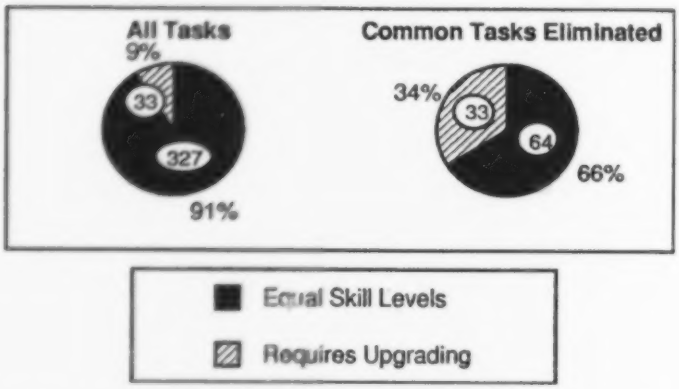

Figure G-6. MOC 631 and all Military Occupations and Civilian Classifications Commonality

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Amalgamation
Commonality
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